



CINCINNATI
COLUMBUS
DAYTON

6305 Centre Park Drive
West Chester, OH 45069
phone ► 513.779.7851
fax ► 513.779.7852
www.kleingers.com

September 30, 2016

City of Oakwood
30 Park Avenue
Oakwood, Ohio 45419

ATTN: Norbert S. Klopsch
City Manager

RE: Oakwood Shroyer Road
Review of March 7, 2016 Safety Study by CMT, Inc.

Dear Mr. Klopsch:

The Kleingers Group has completed its review of the March 7, 2016 safety study that was prepared by CMT, Inc. to identify solutions to safety concerns along Shroyer Road. The purpose of this review is to ensure that the recommended countermeasures were reasonable to address the identified concerns. While the CMT study recommended countermeasures along the length of Shroyer Road, both within the corporation limits of the City of Oakwood and in the area of the Shroyer Road/Dorothy Lane intersection, which is in the City of Kettering, this review focuses on the countermeasures recommended within the City of Oakwood. The findings from our review are outlined below.

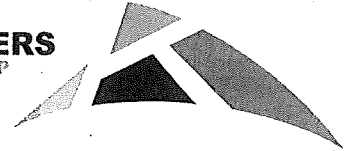
According to the CMT study, the primary traffic safety related issues identified along Shroyer Road are as follows:

1. Speed differential between same direction travel lanes
2. Restricted side-street sight distance at several intersections within the study area
3. Vehicle speeds in excess of the 35 mph posted speed limit
4. Crash patterns within the study area, including
 - a. Rear-end crashes
 - b. Angle crashes
 - c. Left turn crashes
 - d. Sideswipe crashes
5. Bicycle and pedestrian crashes and safety concerns within the study area

Within the Oakwood portion of Shroyer Road, the recommended countermeasures include the following:

1. Implementation of a road diet to reduce the roadway cross section from four travel lanes to three travel lanes (one 11.5-foot northbound lane, one 11.5-foot southbound lane, and one 11-foot median lane) and a 5-foot bicycle lane in each direction.
2. Construction of a raised median between intersections along Shroyer Road.

JOB #: 160553.000



FINDINGS

Based on our review of the study, the recommended countermeasures appear to be reasonable to address the crash patterns and other safety related issues identified in the study. The recommended countermeasures also accomplish some of the objectives outlined in the City's comprehensive plan.

Road Diet

According to FHWA's publication *Road Diet Informational Guide*, road diets have been successful in reducing conflicts that contribute to various crash types, including rear-end, left turn, and sideswipe crashes. It also indicates that right angle crashes may be reduced since side street drivers are only required to cross three lanes of traffic instead of four.

According to the Guide, studies have shown that road diets can function effectively on roadways with average daily traffic volumes of up to 24,000 vehicles per day, with other studies showing a maximum recommended average daily traffic of 15,000 vehicles per day to 17,500 vehicles per day. The CMT study indicates that the average daily traffic volume for Shroyer Road is 15,000 vehicles per day. Peak hour capacity analyses at the highest volume intersections within the City's portion of Shroyer Road show that only small increases in delays are expected, indicating that a road diet should operate effectively.

The *Road Diet informational Guide* also indicates that converting from a four-lane section to a three lane section is effective in reducing travel speeds and addressing the problem of high speed differential between same direction travel lanes; a problem that is typical on four-lane sections.

While the recommended road diet will not directly address sight distance obstructions that exist beyond the curb line of some intersections, the anticipated reduction in vehicle speeds along Shroyer Road are expected to increase the time from when a side street motorist first sees an approaching vehicle on Shroyer Road until that vehicle reaches the intersection.

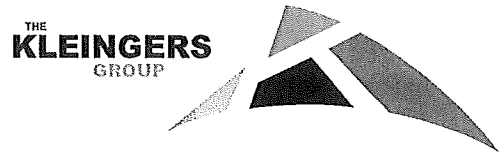
According to the Ohio Department of Transportation's Location and Design Manual, the minimum lane width on an arterial street with speeds less than 50 mph is 11 feet and the preferred operating bicycle lane width is 5 feet. Since the study recommends 11.5-foot through travel lanes, an 11-foot median lane, and 5-foot bike lanes, the minimum required lane widths are met. During the design of the project, it was determined that the median lane would be constructed as an 8-foot wide raised median with a 1.5 foot buffer on each side. The recommendation of bike lanes is consistent with the objective of encouraging safe bicycle movement in the City, as outlined in the City's comprehensive plan.

Raised Medians

According to FHWA's publication, *Safety Benefits of Raised Medians and Pedestrian Refuge Areas*, raised medians can be beneficial for a number of reasons. Some of the reasons are as follows:

- A raised median allows a pedestrian to cross one direction of travel at a time. Providing raised medians at marked crosswalks has been shown to reduce pedestrian related crashes by 46 percent. Providing raised medians at unmarked crosswalks has been shown to reduce pedestrian related crashes by 39 percent.
- Raised medians have been shown to reduce motor vehicle crashes by 15 percent.

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- Raised medians have been shown to reduce vehicular speeds.

While the raised medians were recommended to further improve safety along the corridor, it should be noted that the proposed median will restrict left turns to and from residential driveways along Shroyer Road, which will require residents to make U-turns at nearby intersections or divert to adjacent streets when traveling to and from their homes. Due to the 44-foot curb to curb width, most passenger vehicles cannot perform a U-turn from the proposed center turn lane while remaining within the limits of the curb lines along Shroyer Road. As a result, drivers must use a portion of the side street approach aprons to facilitate their turns. While we were able to successfully complete U-turns in a mid-sized car at several of the intersections along Shroyer Road as part of this review, it is anticipated that some drivers may have some difficulty making this turn. Also, at times when another motorist approaches on the side street, the driver attempting to make a U-turn from Shroyer Road may not be able to do so due to the presence of the side street vehicle. For these reasons, some drivers, may elect to go around the block on the adjacent grid street network in lieu of making a direct U-turn. Depending on the number of residential units being served by driveways along a particular block of Shroyer Road, the number of vehicles making U-turns or diverting to the adjacent street network at a particular intersection could be in the range of 5 to 15 vehicles during peak hours.

In summary, the recommended countermeasures described in the CMT study are reasonable approaches to addressing the safety related issues identified in the study and meeting the city's identified priorities of vehicular safety, pedestrian safety, traffic calming, and bicycle accommodations. Importantly, the recommended countermeasures meet objectives identified in the city's comprehensive plan. It is our understanding that the City is aware of the tradeoffs associated with implementing countermeasures to improve conditions along the corridor, one of which is the need for residents along Shroyer Road to make U-turns or side-street diversions due to the installation of the raised medians.

Thank you for the opportunity to assist the City with this review. I trust that this addresses your concerns. If you have any questions or if there is any additional information you need, please do not hesitate to contact us.

Sincerely,
THE KLEINGERS GROUP

A handwritten signature in black ink, appearing to read "Mark W. Nolt". The signature is written in a cursive, flowing style.

Mark W. Nolt, PE, PTOE
Project Manager

cc: FILE